



Concept Stormwater Plan

Merrimack Elementary School Constructed Wetland

Legend

Existing Stormwater Inlet

Existing Stormwater Pipe

Proposed Stormwater Structure

Proposed Stormwater Pipe



BMP Drainage Area



Proposed Constructed Wetland

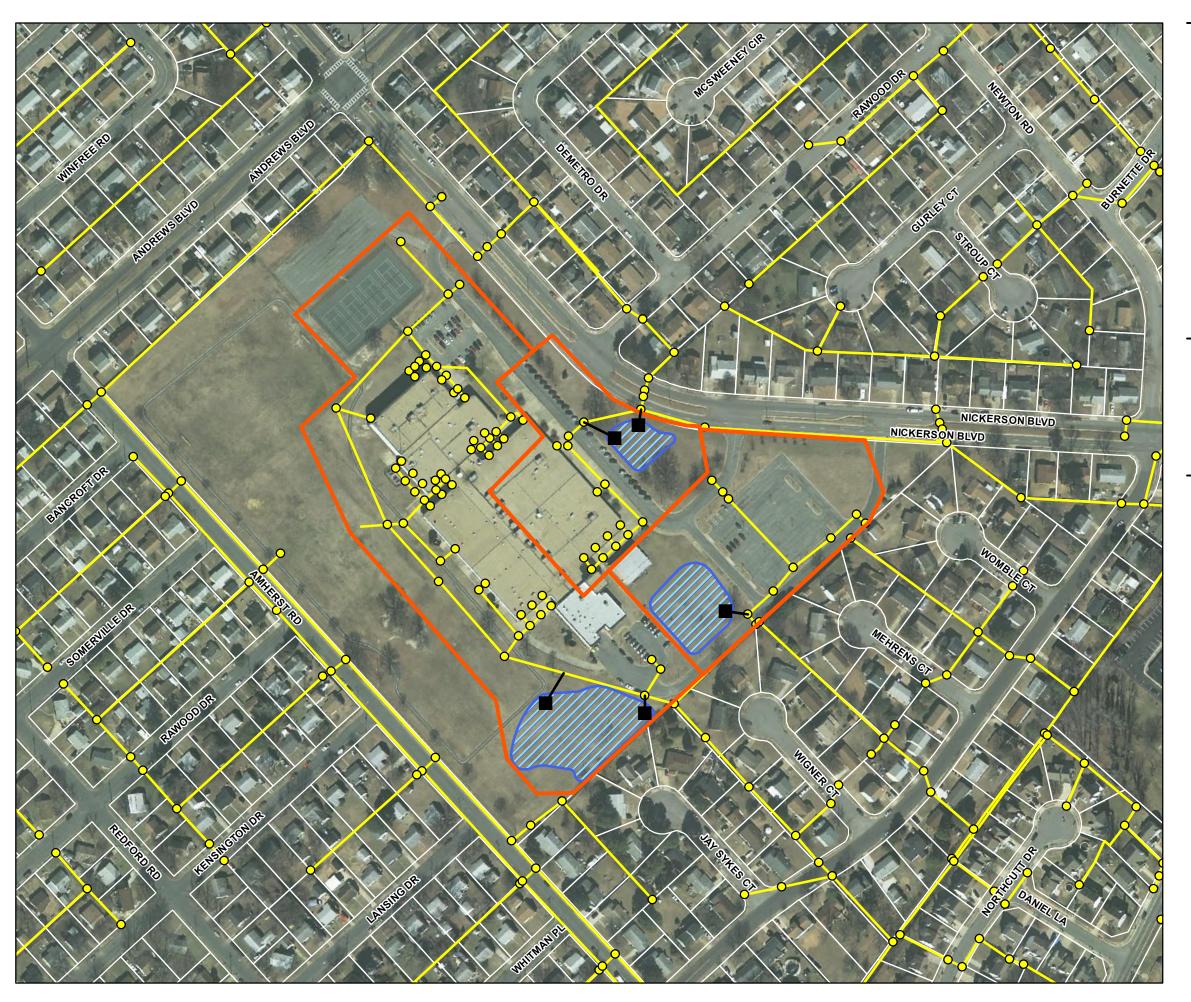
0 100 200 40 1 inch = 200 feet



Prepared for:









Concept Stormwater Plan

Jones Magnet School Bioretention Area

Legend

Existing Stormwater Inlet

Existing Stormwater Pipe

Proposed Stormwater Structure

Proposed Stormwater Pipe



BMP Drainage Area



Proposed Bioretention Area

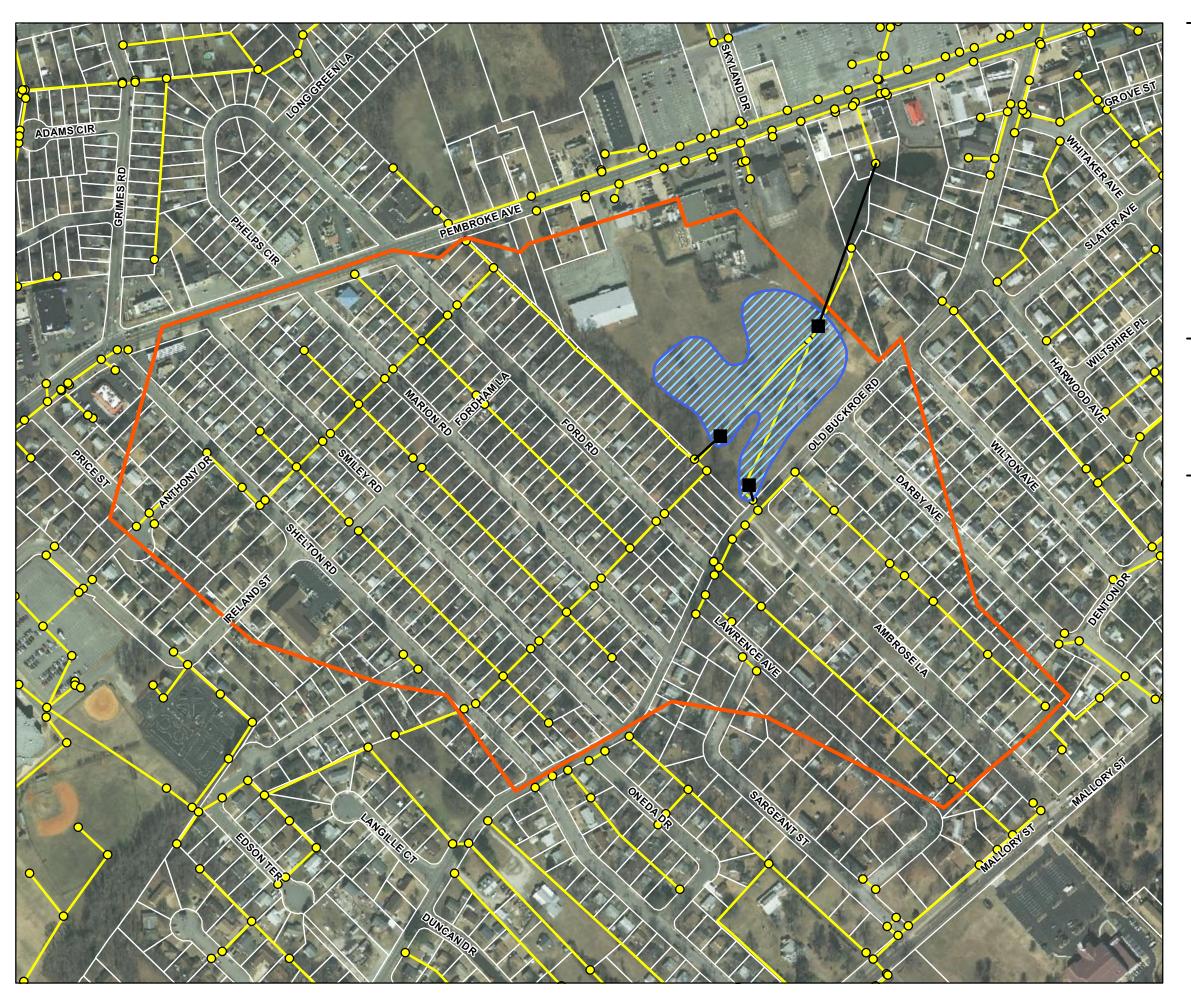
0 100 200 40 1 inch = 200 feet



Prepared for:









Concept Stormwater Plan

Buckroe Shopping Mall Constructed Wetland

Legend

Existing Stormwater Inlet

Existing Stormwater Pipe

Proposed Stormwater Structure

Proposed Stormwater Pipe

Prop

Proposed BMP Drainage Area



Proposed Constructed Wetland

150 300 6 1 inch = 300 feet



Prepared for:









Concept Stormwater Plan

Buckroe Avenue Redevelopment Constructed Wetland

Legend

Existing Stormwater Inlet

Existing Stormwater Pipe

Proposed Stormwater Structure

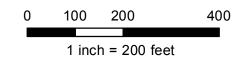
Proposed Stormwater Pipe



BMP Drainage Area



Proposed Constructed Wetland

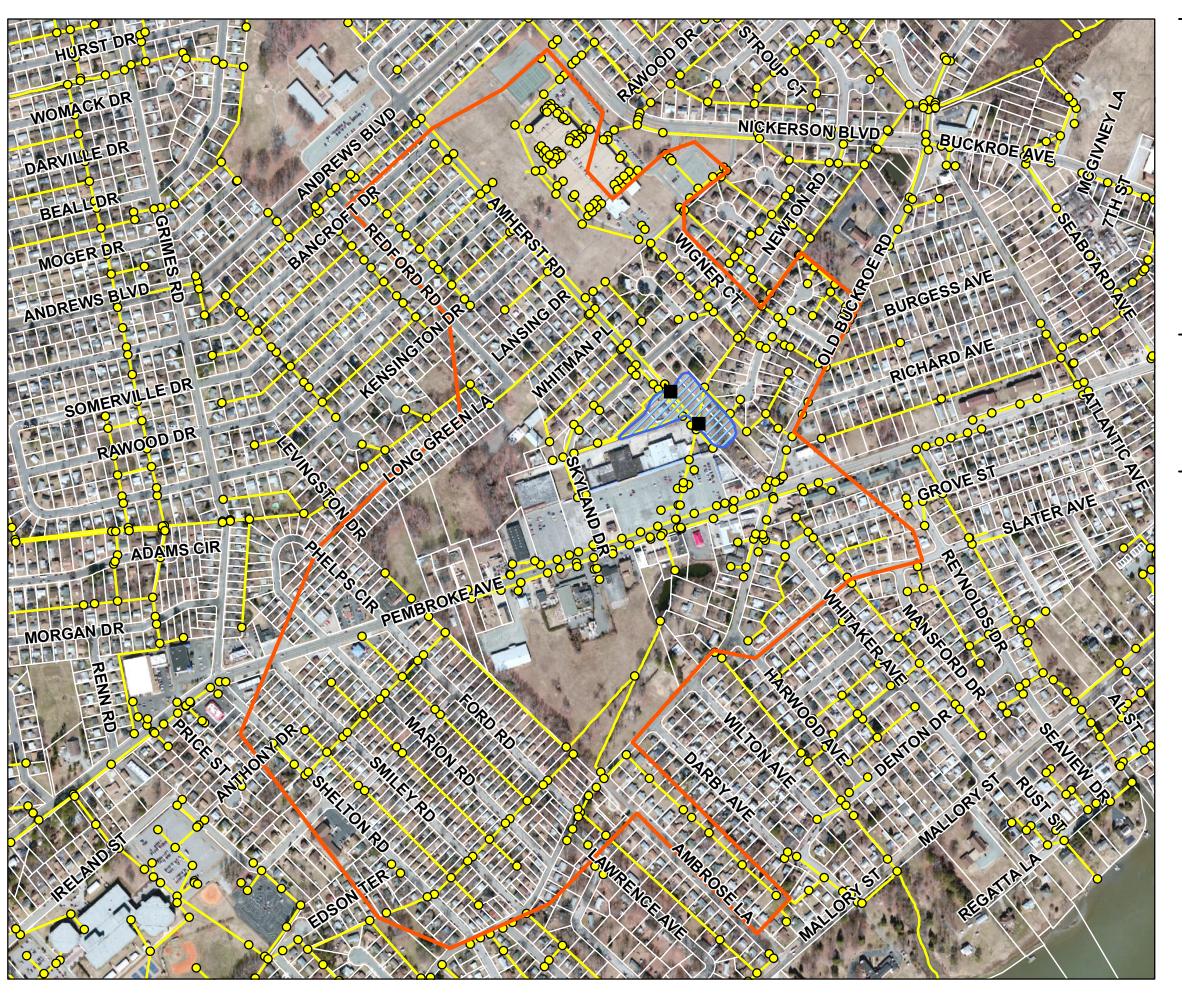




Prepared for:









Concept Stormwater Plan

Amherst Road Constructed Wetland

Legend

- Existing Stormwater Inlet
- Existing Stormwater Pipe
- Proposed Stormwater Structure
 - Proposed_Pipe
- Proposed BMP Drainage Area



Prepared for:









Concept Stormwater Plan

Fields Drive Constructed Wetland

Legend

Existing Stormwater Inlet

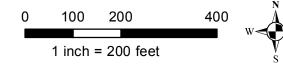
Existing Stormwater Pipe

Proposed Stormwater Structure

Prop

Proposed BMP Drainage Area

Proposed Constructed Wetland

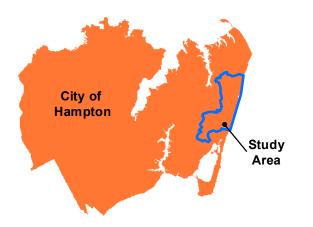


Prepared for:









Concept Stormwater Plan

Hall Road Constructed Wetland

Legend

Existing Stormwater Inlet

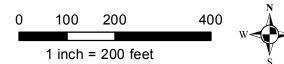
Existing Stormwater Pipe

Proposed Stormwater Structure

7

Proposed BMP Drainage Area

Proposed Constructed Wetland



Prepared for:









Concept Stormwater Plan

5th Street Drainage Improvements

Legend

Existing Stormwater Inlet

Existing Stormwater Pipe

Proposed Stormwater Pipe

Proposed Section of Raised Road

Proposed Flood Gate

0 100 200 400 1 inch = 200 feet



Prepared for:









Concept Stormwater Plan SWMM Model Link-Node Map

Legend

SWMM Model Nodes

SWMM Model Links



Project Area

600 1,200

1 inch = 1,200 feet

2,400

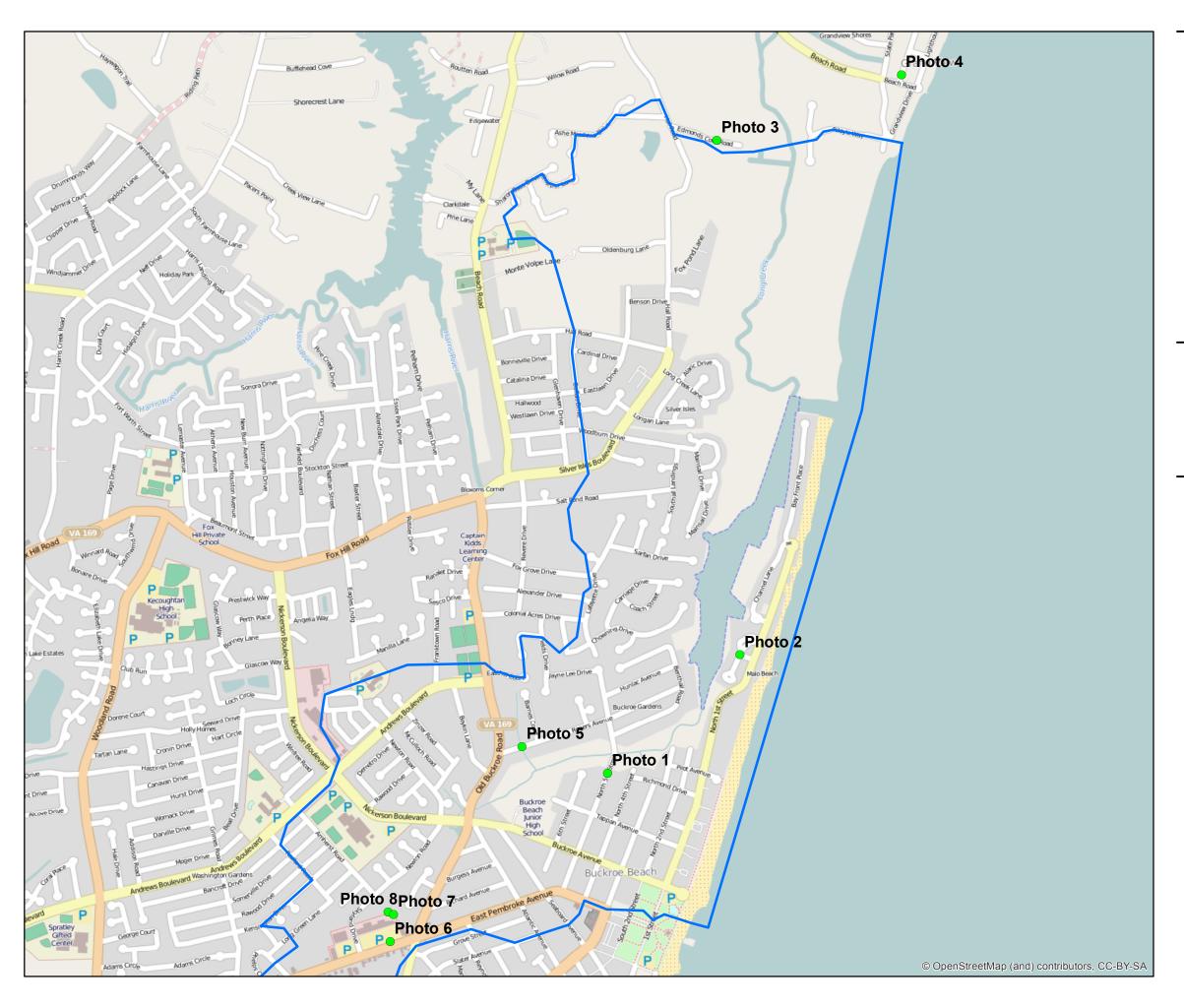


Prepared for:











Photograph Log Map

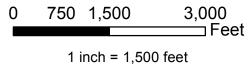
Legend



Photo Station



Project Area





Prepared for:







Project: Buckroe Beach Watershed Study	Prepared by: Rachel Watts
Job Number: 116227084	Date: November 19, 2013
Photo Event: Site Visit	Page: Page 1 of 4



Photo 1: View of flooding on N 5th Street facing north



Photo 2: View of Salt Ponds looking northwest



Project: Buckroe Beach Watershed Study	Prepared by: Rachel Watts
Job Number: 116227084	Date: November 19, 2013
Photo Event: Site Visit	Page: Page 2 of 4



Photo 3: View of Wallace Creek facing south



Photo 4: View of flooding adjacent to Bonita Drive, facing west



Project: Buckroe Beach Watershed Study	Prepared by: Rachel Watts
Job Number: 116227084	Date: November 19, 2013
Photo Event: Site Visit	Page: Page 3 of 4



Photo 5: View of a drainage ditch adjacent to Rogers Avenue, facing north



Photo 6: View of flooding in the parking lot of Buckroe Shopping Center, facing north



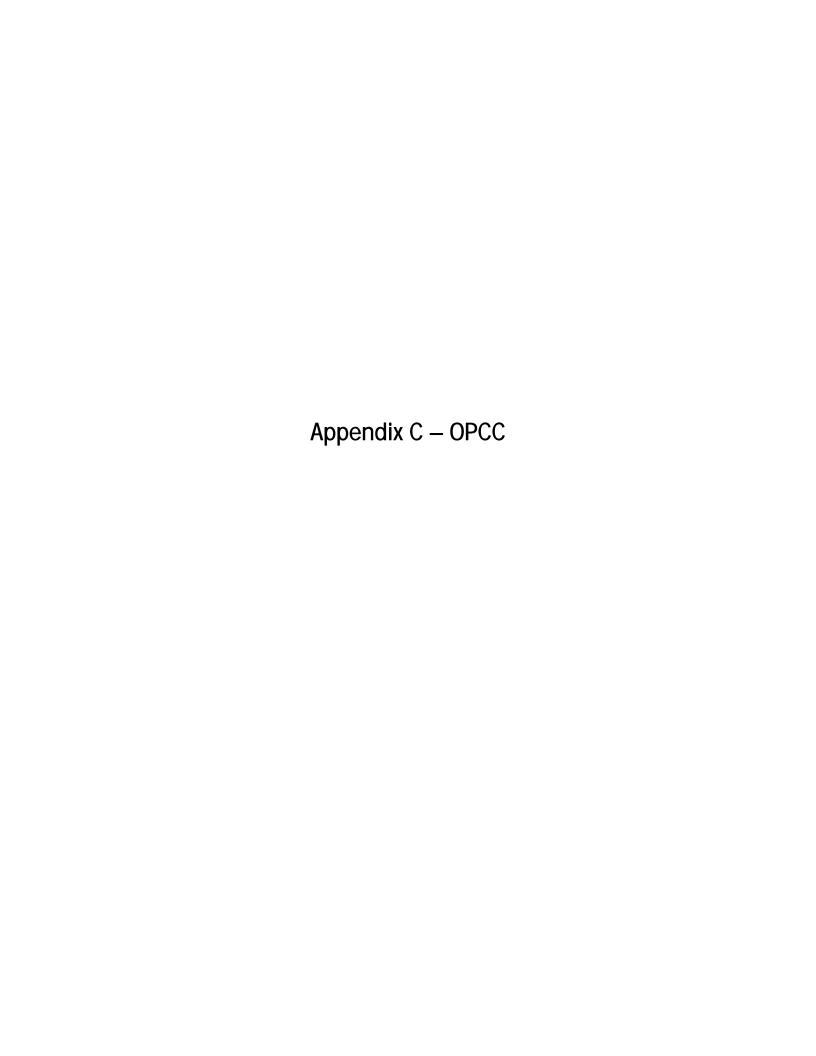
Project: Buckroe Beach Watershed Study	Prepared by: Rachel Watts
Job Number: 116227084	Date: November 19, 2013
Photo Event: Site Visit	Page: Page 4 of 4



Photo 7: View of a drainage ditch behind Buckroe Shopping Center, facing northeast



Photo 8: View of a drainage ditch behind Buckroe Shopping Center, facing west



Stormwater Feature	Total Cost	Pounds of Pollutants Removed			Costs per Pound of Pollutants Removed		
Stormwater reature	Total cost	TP	TN	TSS	TP	TN	TSS
Merrimack Elementary Wetland	\$239,000	15	43	3775	\$15,923	\$5,566	\$63
Jones Magnet Middle School Bioretention	\$418,000	21	164	4499	\$20,232	\$2,546	\$93
Buckroe Shopping Mall Wetland	\$769,000	45	127	11205	\$17,262	\$6,033	\$69
Buckroe Shopping Mall Permeable Pavement	\$288,000	14	122	897	\$20,719	\$2,353	\$321
Buckroe Avenue Redevelopment Wetland	\$229,000	12	36	3141	\$18,335	\$6,409	\$73
Amherst Road Wetland	\$596,000	38	109	9619	\$15,586	\$5,446	\$62
Fields Drive Wetland	\$138,000	7	19	1656	\$20,941	\$7,325	\$83
Hall Road Wetland	\$271,000	8	24	2072	\$32,888	\$11,498	\$131
5th Street Drainage Improvements	\$1,506,000	NA	NA	NA	NA	NA	NA

Notes:

- This cost opinion is based solely upon the conceptual improvements presented in the Watershed Management Plan for the Buckroe Beach and Riley's Way watershed as prepared by Kimley-Horn and Associates, Inc.
- 2. This cost opinion does not include costs for land acquisition, off-site right-of-way, off-site easements, permitting, or design.
- 3. This cost opinion does not include wetland/stream mitigation fees, unforseen remediation of site contaminants, or any other similar local or state development fees.
- 4. Unit costs used in this cost opinion are representative of typical market costs for this area as of the date of this cost opinion, and do not account for inflationary cost escalation during the time period from the date of this cost opinion to the start of construction.
- 5. No geotechnical reports have been completed at this stage of the probable opinion of construction cost.
- 6. Construction phase inspection service costs are not included in this estimate.
- 7. Grading estimates are only conceptual and are based on existing GIS contours available for the study area. Estimates are not based on topographic survey by a licensed surveyor. This should be estimated during design.

The Engineer has no control over the cost of labor, materials, or equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs, as provided here, are made on the basis of the Engineer's experience and qualifications and represent the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from opinions of probable cost prepared for the Owner.

Merrimack Elementary Constructed Wetland Retrofit

Item	Unit	Quantity	Unit Cost	Total Cost
36" Reinforced Concrete Pipe, Installed	Linear Foot	90	\$145	\$13,050
Connection to Existing Structure, 15"- 36" Pipe	Each	2	\$765	\$1,530
Riser Structure, Installed	Vertical Linear Foot	6	\$400	\$2,400
Excavation (Hauled Off-Site)	Cubic Yard	4,270	\$15	\$64,050
Import Topsoil (Assume 2" From Off- Site)	Cubic Yard	240	\$15	\$3,600
Wetland Planting	Square Yard	4,270	\$10	\$42,700
12" Rip Rap, Not Grouted	Square Yard	60	\$44	\$2,640
Clearing and Grubbing, Light	Acre	4	\$6,650	\$23,940
Construction Survey and Stake Out	Each	1	\$8,000	\$8,000
Erosion and Sediment Control	Each	1	\$5,000	\$5,000
Mobilization	Percent of Sub- Total	5	\$1,670	\$8,350
Design	Percent of Sub- Total	25	\$1,670	\$41,750
Sub-Total Construction Cost				\$217,000
Contingency	Percent of Sub- Total	10	\$2,170	\$22,000
Total Construction Cost				\$239,000

Jones Magnet Middle School Bioretention Retrofit

Item	Unit	Quantity	Unit Cost	Total Cost
18" Reinforced Concrete Pipe, Installed	Linear Foot	150	\$67	\$10,050
30" Reinforced Concrete Pipe, Installed	Linear Foot	110	\$104	\$11,440
Connection to Existing Structure, 15"- 36" Pipe	Each	5	\$763	\$3,820
Manhole	Each	1	\$492	\$490
Riser Structure	Vertical Linear Foot	9	\$400	\$3,600
Underdrain	Linear Foot	1,500	\$18	\$27,000
Excavation	Cubic Yard	3,750	\$15	\$56,250
Engineered Soil Mixture	Cubic Yard	1,980	\$50	\$99,000
Bioretention Planting	Square Yard	7,500	\$10	\$75,000
12" Rip Rap, Not Grouted	Square Yard	150	\$44	\$6,600
Clearing and Grubbing, Light	Acre	2	\$6,650	\$9,980
Construction Survey and Stake Out	Each	1	\$3,500	\$3,500
Erosion and Sediment Control	Each	1	\$2,500	\$2,500
Mobilization	Percent of Sub- Total	5	\$3,090	\$15,450
Design	Percent of Sub- Total	25	\$3,090	\$77,250
Sub-Total Construction Cost				\$380,000
Contingency	Percent of Sub- Total	10	\$3,800	\$38,000
Total Construction Cost				\$418,000

Buckroe Shopping Mall Constructed Wetland Retrofit

Item	Unit	Quantity	Unit Cost	Total Cost
18" Reinforced Concrete Pipe, Installed	Linear Foot	160	\$67	\$10,720
36" Reinforced Concrete Pipe, Installed	Linear Foot	540	\$145	\$78,300
Connection to Existing Structure, 15"- 36" Pipe	Each	3	\$763	\$2,290
Riser Structure, Installed	Vertical Linear Foot	6	\$400	\$2,400
Pipe Demolition, 15"-24" Pipe	Linear Foot	920	\$50	\$46,000
Excavation (Hauled Off-Site)	Cubic Yard	13,870	\$15	\$208,050
Import Topsoil (Assume 2" From Off- Site)	Cubic Yard	780	\$15	\$11,700
Wetland Planting	Square Yard	13,870	\$10	\$138,700
12" Rip Rap, Not Grouted	Square Yard	90	\$44	\$3,960
Clearing and Grubbing, Light	Acre	2.9	\$6,650	\$19,290
Construction Survey and Stake Out	Each	1	\$10,000	\$10,000
Erosion and Sediment Control	Each	1	\$6,500	\$6,500
Mobilization	Percent of Sub- Total	5	\$5,380	\$26,900
Design	Percent of Sub- Total	25	\$5,380	\$134,500
Sub-Total Construction Cost				\$699,000
Contingency	Percent of Sub- Total	10	\$6,990	\$70,000
Total Construction Cost				\$769,000

Buckroe Shopping Mall Permeable Pavement Retrofit

Item	Unit	Quantity	Unit Cost	Total Cost
Permeable Pavement Materials and Installation	Square Yard	29,100	\$9	\$261,900
Sub-Total Construction Cost				\$261,900
Contingency	Percent of Sub- Total	10	\$2,620	\$26,000
Total Construction Cost				\$288,000

Buckroe Avenue Redevelopment Constructed Wetland Retrofit

Item	Unit	Quantity	Unit Cost	Total Cost
24" Reinforced Concrete Pipe, Installed	Linear Foot	130	\$87	\$11,310
36" Reinforced Concrete Pipe, Installed	Linear Foot	190	\$145	\$27,550
Connection to Existing Structure, 15"- 36" Pipe	Each	2	\$763	\$1,530
Riser Structure, Installed	Vertical Linear Foot	6	\$400	\$2,400
Excavation (Hauled Off-Site)	Cubic Yard	4,080	\$15	\$61,200
Import Topsoil (Assume 2" From Off- Site)	Cubic Yard	230	\$15	\$3,450
Wetland Planting	Square Yard	4,080	\$10	\$40,800
12" Rip Rap, Not Grouted	Square Yard	60	\$44	\$2,640
Clearing and Grubbing, Light	Acre	0.4	\$6,650	\$2,660
Construction Survey and Stake Out	Each	1	\$4,000	\$4,000
Erosion and Sediment Control	Each	1	\$2,500	\$2,500
Mobilization	Percent of Sub- Total	5	\$1,600	\$8,000
Design	Percent of Sub- Total	25	\$1,600	\$40,000
Sub-Total Construction Cost				\$208,000
Contingency	Percent of Sub- Total	10	\$2,080	\$21,000
Total Construction Cost				\$229,000

Amherst Road Constructed Wetland Retrofit

Item	Unit	Quantity	Unit Cost	Total Cost
24" Reinforced Concrete Pipe, Installed	Linear Foot	290	\$67	\$19,430
36" Reinforced Concrete Pipe, Installed	Linear Foot	440	\$145	\$63,800
Connection to Existing Structure, 15"- 36" Pipe	Each	2	\$763	\$1,530
Riser Structure, Installed	Vertical Linear Foot	6	\$400	\$2,400
Pipe Demolition, 15"-24" Pipe	Linear Foot	270	\$50	\$13,500
Excavation (Hauled Off-Site)	Cubic Yard	10,800	\$15	\$162,000
Import Topsoil (Assume 2" From Off- Site)	Cubic Yard	600	\$15	\$9,000
Wetland Planting	Square Yard	10,800	\$10	\$108,000
12" Rip Rap, Not Grouted	Square Yard	30	\$44	\$1,320
Clearing and Grubbing, Light	Acre	2.2	\$6,650	\$14,840
Construction Survey and Stake Out	Each	1	\$15,000	\$15,000
Erosion and Sediment Control	Each	1	\$6,500	\$6,500
Mobilization	Percent of Sub- Total	5	\$4,170	\$20,850
Design	Percent of Sub- Total	25	\$4,170	\$104,250
Sub-Total Construction Cost				\$542,000
Contingency	Percent of Sub- Total	10	\$5,420	\$54,000
Total Construction Cost				\$596,000

Fields Drive Constructed Wetland Retrofit

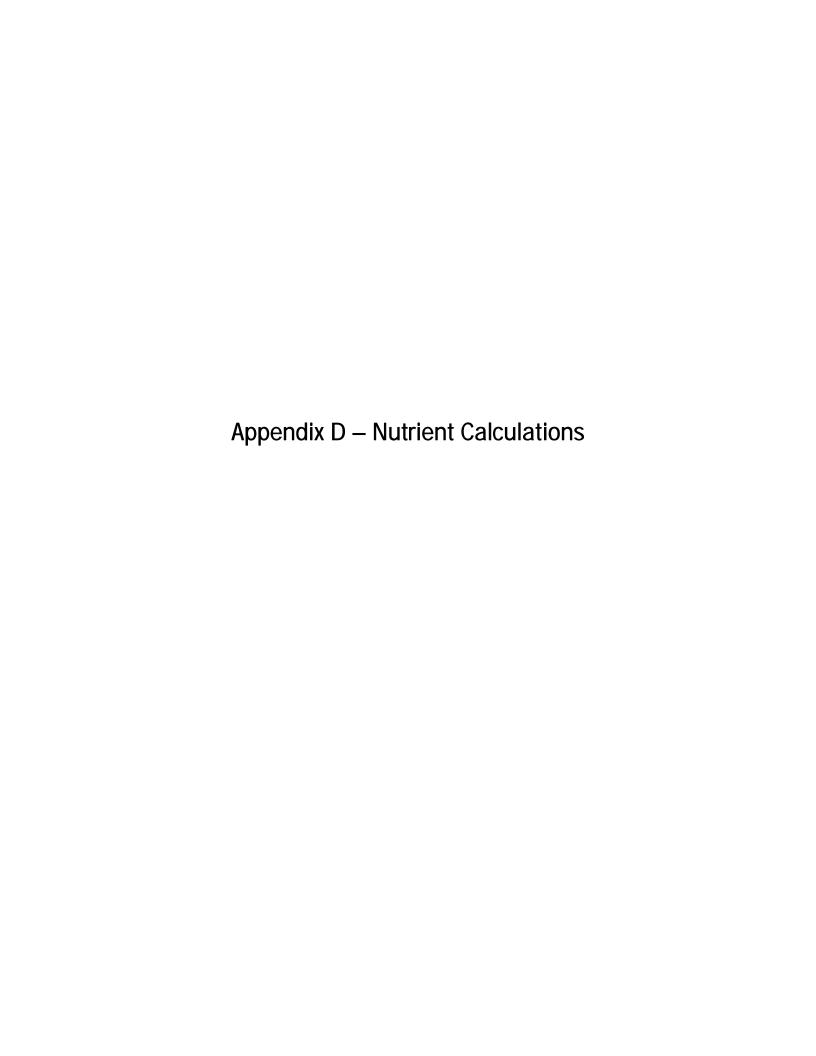
Item	Unit	Quantity	Unit Cost	Total Cost
24" Reinforced Concrete Pipe, Installed	Linear Foot	170	\$67	\$11,390
Connection to Existing Structure, 15"- 36" Pipe	Each	2	\$763	\$1,530
Riser Structure, Installed	Vertical Linear Foot	6	\$400	\$2,400
Excavation (Hauled Off-Site)	Cubic Yard	2,400	\$15	\$36,000
Import Topsoil (Assume 2" From Off- Site)	Cubic Yard	130	\$15	\$1,950
Wetland Planting	Square Yard	2,400	\$10	\$24,000
12" Rip Rap, Not Grouted	Square Yard	30	\$44	\$1,320
Clearing and Grubbing, Light	Acre	0.5	\$6,650	\$3,300
Construction Survey and Stake Out	Each	1	\$8,000	\$8,000
Erosion and Sediment Control	Each	1	\$6,500	\$6,500
Mobilization	Percent of Sub- Total	5	\$960	\$4,800
Design	Percent of Sub- Total	25	\$960	\$24,000
Sub-Total Construction Cost				\$125,000
Contingency	Percent of Sub- Total	10	\$1,250	\$13,000
Total Construction Cost				\$138,000

Hall Road Constructed Wetland Retrofit

Item	Unit	Quantity	Unit Cost	Total Cost
24" Reinforced Concrete Pipe, Installed	Linear Foot	290	\$67	\$19,430
36" Reinforced Concrete Pipe, Installed	Linear Foot	440	\$145	\$63,800
Connection to Existing Structure, 15"- 36" Pipe	Each	2	\$763	\$1,530
Riser Structure, Installed	Vertical Linear Foot	6	\$400	\$2,400
Excavation (Hauled Off-Site)	Cubic Yard	3,100	\$15	\$46,500
Import Topsoil (Assume 2" From Off- Site)	Cubic Yard	170	\$15	\$2,550
Wetland Planting	Square Yard	3,100	\$10	\$31,000
12" Rip Rap, Not Grouted	Square Yard	30	\$44	\$1,320
Clearing and Grubbing, Light	Acre	1	\$6,650	\$4,260
Construction Survey and Stake Out	Each	1	\$10,000	\$10,000
Erosion and Sediment Control	Each	1	\$6,500	\$6,500
Mobilization	Percent of Sub- Total	5	\$1,890	\$9,450
Design	Percent of Sub- Total	25	\$1,890	\$47,250
Sub-Total Construction Cost				\$246,000
Contingency	Percent of Sub- Total	10	\$2,460	\$25,000
Total Construction Cost				\$271,000

5th Street Drainage Improvements

Item	Unit	Quantity	Unit Cost	Total Cost
Storm Surge Gate and Associated Infrastructure	Lump Sum	1	\$500,000	\$500,000
60" Reinforced Concrete Pipe, Installed	Linear Foot	150	\$361	\$54,150
8" Asphalt Baselayer	Ton	1,200	\$80	\$96,000
2" Asphalt Surface Layer	Ton	300	\$102	\$30,600
Guardrail	Linear Foot	1,200	\$13	\$15,600
Fill, Delivered	Cubic Yard	5,000	\$15	\$75,000
Tidal Wetlands Impact Mitigation	Acre	1	\$527,000	\$263,500
Construction Survey and Stake Out	Each	1	\$12,000	\$12,000
Erosion and Sediment Control	Each	1	\$6,000	\$6,000
Mobilization	Percent of Sub- Total	5	\$10,530	\$52,650
Design	Percent of Sub- Total	25	\$10,530	\$263,250
Sub-Total Construction Cost				\$1,369,000
Contingency	Percent of Sub- Total	10	\$13,690	\$137,000
Total Construction Cost				\$1,506,000



Site Data					
Drainet Name, Marrimonk Flamonton,	Cabaal Biarata	nution Avon			
Project Name: Merrimack Elementary	School Biorett	ention Area			
Date: November, 2013		1			
	data input cells				
	calculation cells				
	constant values				
1. Post-Development Project & L	and Cover In	formation			
Constants					
Annual Rainfall (inches)	44				
Target Rainfall Event (inches)	1.00		NO	4.00	
Phosphorus EMC (mg/L)	0.26		Nitrogen EMC (mg/L)	1.86	
Target Phosphorus Target Load (lb/acre/yr)	0.41				
Pj	0.90				
Land Cover (acres)					
Land Cover (acres)	A soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) undisturbed,	A SOIIS	B Solis	C Soils	D Solis	Iotais
protected forest/open space or reforested land	0.00	0.00	0.00	4.70	4.70
Managed Turf (acres) disturbed, graded for	0.00	0.00	0.00	4.70	4.70
yards or other turf to be mowed/managed	0.00	0.00	0.00	0.27	0.27
Impervious Cover (acres)	0.00	0.00	0.00	9.27 11.24	9.27 11.24
impervious Cover (acres)	0.00	0.00	0.00	Total	25.21
				Total	25.21
Rv Coefficients					
NV COEITICIEITIS	A soils	B Soils	C Soils	D Soils	
Forest/Open Space	0.02	0.03	0.04	0.05	
Managed Turf	0.15	0.20	0.04	0.25	
Impervious Cover	0.95	0.95	0.95	0.95	
Impervious cover	0.55	0.55	0.55	0.55	
Land Cover Summary					
Forest/Open Space Cover (acres)	4.70)			
Weighted Rv(forest)	0.05				
% Forest	19%				
Managed Turf Cover (acres)	9.27				
Weighted Rv(turf)	0.25				
% Managed Turf	37%				
Impervious Cover (acres)	11.24				
Rv(impervious)	0.95				
% Impervious	45%				
Total Site Area (acres)	25.21				
Site Rv	0.52				
Post-Development Treatment Volume (acre-ft)	1.10)			
Post-Development Treatment Volume (cubic					
feet)	48,027	7			
Post_Development Load (TP) (lb/yr)	30.59		velopment Load (TN) (lb/yr)	218.8	33
Total Load (TP) Reduction Required (lb/yr)	20.25			210.0	

						1				
Drainage Area - Merrimac	k Elementa	ry School								
	 									
Drainage Area A Land Cover (acres)									
-	A soils	B Soils	C Soils	D Soils	Totals					
Forest/Open Space (acres)										
undisturbed, protected forest/open										
space or reforested land	0.00	0.00	0.00	4.70	4.70					
Managed Turf (acres) disturbed,										
graded for yards or other turf to be										
mowed/managed	0.00	0.00	0.00	9.27	9.27					
Impervious Cover (acres)	0.00	0.00	0.00	11.24	11.24					
				Total	25.21					
Apply Drootions that Down	ave Dellute	nto but Do	Not Doduce D	off \/alver						
Apply Practices that Rem	ove Polluta	ants but Do		unoff Volur	ne					
Apply Practices that Rem	ove Polluta	ants but Do	Area (excluding	unoff Volur		Phoenhorus Load		Phoenhorus	Pomaining	Downstroom
Apply Practices that Rem	ove Polluta	ants but Do	Area (excluding areas treated by		Runoff from	Phosphorus Load	Untreated Phoenhorus	Phosphorus Pomoved By	Remaining	Downstream Treatment to
			Area (excluding areas treated by upstream	Phosphorus	Runoff from Upstream RR	from Upstream RR	Untreated Phosphorus	Removed By	Phosphorus	Treatment to
Practice		ants but Do	Area (excluding areas treated by		Runoff from Upstream RR	from Upstream RR	Untreated Phosphorus Load to Practice (lbs.)	Removed By		Treatment to
Practice	U	Init	Area (excluding areas treated by upstream	Phosphorus	Runoff from Upstream RR	from Upstream RR		Removed By	Phosphorus	Treatment to
Practice	U impervious ac	Init cres draining to	Area (excluding areas treated by upstream practices)	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs)	Load to Practice (lbs.)	Removed By Practice (lbs.)	Phosphorus Load (lbs.)	Treatment to be Employed
Practice 12. Constructed Wetland	U impervious ac wet	Init cres draining to	Area (excluding areas treated by upstream practices)	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs)	Load to Practice (lbs.) 24.66	Removed By Practice (lbs.)	Phosphorus Load (lbs.)	Treatment to be Employed
Practice 12. Constructed Wetland	impervious ac wet turf acres drai	Init cres draining to tland ining to wetland	Area (excluding areas treated by upstream practices)	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs)	Load to Practice (lbs.)	Removed By Practice (lbs.)	Phosphorus Load (lbs.)	Treatment to be Employed
Practice 12. Constructed Wetland	impervious ac wet turf acres drai impervious ac	Init cres draining to tland ining to wetland cres draining to	Area (excluding areas treated by upstream practices) 11.24 9.27	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs) 0.00 0.00	24.66 5.35	Removed By Practice (lbs.) 12.33 2.68	Phosphorus Load (lbs.)	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious ac wet turf acres drai impervious ac wet	Init cres draining to tland ining to wetland cres draining to tland tland	Area (excluding areas treated by upstream practices) 11.24 9.27 0.00	Phosphorus Efficiency (%) 50 50 75	Runoff from Upstream RR Practices (cf) 0.00 0.00	from Upstream RR Practices (lbs) 0.00 0.00 0.00	24.66 5.35	Removed By Practice (lbs.) 12.33 2.68	Phosphorus Load (lbs.) 12.33 2.68	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious ac wet turf acres drai impervious ac wet	Init cres draining to tland ining to wetland cres draining to	Area (excluding areas treated by upstream practices) 11.24 9.27	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs) 0.00 0.00 0.00	24.66 5.35	Removed By Practice (lbs.) 12.33 2.68	Phosphorus Load (lbs.) 12.33 2.68	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious ac wet turf acres drai impervious ac wet	Init cres draining to tland ining to wetland cres draining to tland tland	Area (excluding areas treated by upstream practices) 11.24 9.27 0.00 0.00	Phosphorus Efficiency (%) 50 50 75 75	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00	0.00 0.00 0.00 0.00	24.66 5.35 0.00	12.33 2.68 0.00	Phosphorus Load (lbs.) 12.33 2.68	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious ac wet turf acres drai impervious ac wet	Init cres draining to tland ining to wetland cres draining to tland tland	Area (excluding areas treated by upstream practices) 11.24 9.27 0.00 0.00	Phosphorus Efficiency (%) 50 50 75 75	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 0.00	24.66 5.35 0.00 0.00 NOFF VOLUME IN D.A. A	12.33 2.68 0.00 0.00	Phosphorus Load (lbs.) 12.33 2.68	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious ac wet turf acres drai impervious ac wet	Init cres draining to tland ining to wetland cres draining to tland tland	Area (excluding areas treated by upstream practices) 11.24 9.27 0.00 0.00	Phosphorus Efficiency (%) 50 50 75 75	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 0.00	24.66 5.35 0.00	12.33 2.68 0.00 0.00	Phosphorus Load (lbs.) 12.33 2.68	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious ac wet turf acres drai impervious ac wet	cres draining to tland ining to wetland cres draining to tland ining to wetland ining to wetland	Area (excluding areas treated by upstream practices) 11.24 9.27 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY F	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU TAL PHOSPHORUS RI	24.66	12.33 2.68 0.00 0.00 15.01	Phosphorus Load (lbs.) 12.33 2.68	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious ac wet turf acres drai impervious ac wet	cres draining to tland ining to wetland cres draining to tland ining to wetland ining to wetland	Area (excluding areas treated by upstream practices) 11.24 9.27 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY F	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU TAL PHOSPHORUS RI	24.66 5.35 0.00 0.00 NOFF VOLUME IN D.A. A	12.33 2.68 0.00 0.00 15.01	Phosphorus Load (lbs.) 12.33 2.68	Treatment to be Employed
Practice 12. Constructed Wetland	impervious ac wet turf acres drai impervious ac wet	cres draining to tland ining to wetland cres draining to tland ining to wetland ining to wetland	Area (excluding areas treated by upstream practices) 11.24 9.27 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY F	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU TAL PHOSPHORUS RI	24.66	12.33 2.68 0.00 0.00 15.01	Phosphorus Load (lbs.) 12.33 2.68	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious ac wet turf acres drai impervious ac wet	cres draining to tland ining to wetland cres draining to tland ining to wetland ining to wetland	Area (excluding areas treated by upstream practices) 11.24 9.27 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY F	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT TO	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU FAL PHOSPHORUS RI R SITE COMPLIAN	24.66	12.33 2.68 0.00 0.00 15.01	Phosphorus Load (lbs.) 12.33 2.68	Treatment to be Employed

Site Results		
Phosphorous		
TOTAL TREATMENT VOLUME (cf)	48,027	
TOTAL PHOSPHOROUS LOAD REDUCTION REQUIRED (LB/YEAR)	20.25	
RUNOFF REDUCTION (cf)		
PHOSPHOROUS LOAD REDUCTION ACHIEVED (LB/YR)	15.01	
ADJUSTED POST-DEVELOPMENT PHOSPHOROUS LOAD (TP) (lb/yr)	15.58	
REMAINING PHOSPHOROUS LOAD REDUCTION (LB/YR) NEEDED	5.25	
Nitrogen (for information purposes)		
TOTAL TREATMENT VOLUME (cf)	48,027	
RUNOFF REDUCTION (cf)	0	
NITROGEN LOAD REDUCTION ACHIEVED (LB/YR)		
MITROGEN LOAD REDUCTION ACHIEVED (LB/TK)	42.34	
ADJUSTED POST-DEVELOPMENT NITROGEN LOAD (TP) (lb/yr)	175.89	
ADJUSTED TOST-DEVELOPMENT NITROGEN EGAD (TF) (III/yi)	173.09	

Site Data					
Drainet Names James Magnet Middle	Cahaal Biaratar	otion Aron		1	
Project Name: Jones Magnet Middle	School Bioreter	ition Area			
Date: November, 2013	1				
	data input cells				
	calculation cells				
	constant values				
1. Post-Development Project & L	and Cover In	formation			
Constants					
Annual Rainfall (inches)	44				
Target Rainfall Event (inches)	1.00		A10		
Phosphorus EMC (mg/L)	0.26		Nitrogen EMC (mg/L)	1.86	
Target Phosphorus Target Load (lb/acre/yr)	0.41				
Pj	0.90				
Land (2000)					
Land Cover (acres)	A ooilo	D Coile	C Caile	D Caile	Tetalo
F(1/0	A soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) undisturbed,	0.00	0.00	0.00	0.00	0.00
protected forest/open space or reforested land	0.00	0.00	0.00	0.00	0.00
Managed Turf (acres) disturbed, graded for	0.00	0.00	0.00	7.00	7.00
yards or other turf to be mowed/managed	0.00	0.00	0.00	7.99	7.99
Impervious Cover (acres)	0.00	0.00	0.00	8.36	8.36
				Total	16.35
D. Carffinianta					
Rv Coefficients	A!!-	B Soils	C Soils	D Soils	
Forest/Open Space	A soils	0.03	0.04	0.05	
Managed Turf	0.02	0.03	0.04	0.05	
Impervious Cover	0.15	0.20	0.22	0.25	
Impervious Cover	0.95	0.95	0.95	0.95	
Land Cover Summary					
Forest/Open Space Cover (acres)	0.00				
Weighted Rv(forest)	0.00	D			
% Forest	0%				
Managed Turf Cover (acres)	7.99				
Weighted Rv(turf)	0.25				
% Managed Turf	49%				
Impervious Cover (acres)	8.36				
Rv(impervious)	0.95				
% Impervious	51%				
Total Site Area (acres)	16.35				
Site Rv	0.61	1			
Deat Death and Treatment Value (1970)	0.00				
Post-Development Treatment Volume (acre-ft)	0.83	3			
Post-Development Treatment Volume (cubic	00.55				
feet)	36,080		<u> </u>		40
Post_Development Load (TP) (lb/yr)	22.98		elopment Load (TN) (lb/yr)	164.4	40
Total Load (TP) Reduction Required (lb/yr)	16.28	31			

Drainage Area - Jones Magnet M														
Drainage Area A Land Cover (acres)														
A soils	B Sc	oils C	C Soils	D Soils	Totals									
Forest/Open Space (acres)														
undisturbed, protected forest/open														
space or reforested land 0.00	00	0.00	0.00	0.00	0.00									
Managed Turf (acres) disturbed,														
graded for yards or other turf to be														
mowed/managed 0.00		0.00	0.00	7.99	7.99									
Impervious Cover (acres) 0.00	00	0.00	0.00	8.36	8.36									
				Total	16.35									
Apply Runoff Reduction Practice	oc to Box	duce Tre	atmont Volum	o & Boot D	ovolonment l	and in Drainag	o Aron A							
Apply Kulloli Reduction Fractice	es to ive	uuce me	atment volum	e a rusi-D	evelopilient L	Load III Drailiag	C AICA A							
												Untreated		
									Remaining		Phosphorus Load			Remaining
							Volume from Upstream		Runoff Volume			Load to Practice		Phosphorus
Credit	Unit		Description of	of Credit	Credit	Credit Area (acres)	RR Practice (cf)	Reduction (cf)	(cf)	Efficiency (%)	RR Practices (lbs)	(lbs.)	Practice (lbs.)	Load (lbs.)
6. Bioretention														
	ious acres d													
6.a. Bioretention #1 or Urban	bioretentio		40% runoff volum	ne reduction	0.40	0.00	0	0	0	25	0.00	0.00	0.00	0.00
Bioretention (Spec #9) turf	f acres drain													
	bioretentio		40% runoff volum	ne reduction	0.40	0.00	0	0	0	25	0.00	0.00	0.00	0.00
	ious acres d bioretention		80% runoff volum	no roduction	0.80	8.36	0	23064	5766	50	0.00	18.34	16.51	1.83
6.b. Bioretention #2 (Spec #9)	f acres drain		00% TUTION VOIUN	ie reduction	0.60	0.30	U	23004	3700	50	0.00	18.34	10.51	1.83
l tun	bioretentio		80% runoff volum	ne reduction	0.80	7.99	0	5801	1450	50	0.00	4.61	4.15	0.46
							•							
					TOTAL PHOSPH	HOROUS REMOVAL R	EQUIRED ON SITE (lb/yr)	16.28						1
					TOTALTHOOF		REDUCTION IN D.A. A (cf)							
ļ					TOWAL EDGM BUIL		ACTICES IN D.A. A (lb/yr)	20.66			1		1	

Site Results				
Phosphorous				
TOTAL TREATMENT VOLUME (cf)	36,080			
TOTAL PHOSPHOROUS LOAD REDUCTION REQUIRED (LB/YEAR)	16.28			
RUNOFF REDUCTION (cf)	28864			
PHOSPHOROUS LOAD REDUCTION ACHIEVED (LB/YR)	20.66			
ADJUSTED POST-DEVELOPMENT PHOSPHOROUS LOAD (TP) (lb/yr)	2.32			
REMAINING PHOSPHOROUS LOAD REDUCTION (LB/YR) NEEDED	CONGRATULATION	S!! YOU EXCEEDED THE TARGET REDUC	CTION BY 4.4 LB/YEAR!	!
litrogen (for information purposes)				
TOTAL TREATMENT VOLUME (cf)	36,080			
RUNOFF REDUCTION (cf)				
NITROGEN LOAD REDUCTION ACHIEVED (LB/YR)	151.07			
ADJUSTED POST-DEVELOPMENT NITROGEN LOAD (TP) (lb/yr)	13.32			

Site Data					
Project Name: Buckroe Shopping Ma	II Constructed \	Notland Batrafit			
	ii Constructed i	Welland Retront			
Date: November, 2013	T	1			
	data in a disalla				
	data input cells				
	calculation cells				
	constant values				
	L				
1. Post-Development Project & L	and Cover in	tormation			
Constants					
A court Deletell (leak as)	4.4				
Annual Rainfall (inches)	44				
Target Rainfall Event (inches)	1.00		Nitroger EMO (m = #1)	1.00	
Phosphorus EMC (mg/L)	0.26		Nitrogen EMC (mg/L)	1.86	
Target Phosphorus Target Load (lb/acre/yr)	0.41				
Pj	0.90				
Land Cover (acres)					
Land Oover (acres)	A soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) undisturbed,	A SOLIS	ם טטווס	U JUIIS	טווט ט	ı Jiaia
protected forest/open space or reforested land	0.00	0.00	0.00	2.39	2.39
Managed Turf (acres) disturbed, graded for	0.00	0.00	0.00	2.33	2.39
yards or other turf to be mowed/managed	0.00	0.00	0.00	52.78	52.78
Impervious Cover (acres)	0.00	0.00	0.00	26.72	26.72
impervious cover (acres)	0.00	0.00	0.00	Total	81.89
				Total	01.03
Rv Coefficients					
TV Octionis	A soils	B Soils	C Soils	D Soils	
Forest/Open Space	0.02	0.03	0.04	0.05	
Managed Turf	0.15	0.20	0.22	0.25	
Impervious Cover	0.95	0.95	0.95	0.95	
impervious cover	0.00	0.00	0.00	0.00	
Land Cover Summary					
Forest/Open Space Cover (acres)	2.39				
Weighted Rv(forest)	0.05				
% Forest	3%				
Managed Turf Cover (acres)	52.78				
Weighted Rv(turf)	0.25				
% Managed Turf	64%				
Impervious Cover (acres)	26.72				
Rv(impervious)	0.95				
% Impervious	33%				
Total Site Area (acres)	81.89				
Site Rv	0.47	1			
Post-Development Treatment Volume (acre-ft)	3.22	2			
Post-Development Treatment Volume (cubic		l			
feet)	140,476				
Post_Development Load (TP) (lb/yr)	89.47		elopment Load (TN) (lb/yr)	640.0	7
Total Load (TP) Reduction Required (lb/yr)	55.90				

Drainage Area - Buckroe	g								 	
Orainage Area A Land Cover (acres)									
	A soils	B Soils	C Soils	D Soils	Totals					
Forest/Open Space (acres)										
undisturbed, protected forest/open										
space or reforested land	0.00	0.00	0.00	2.39	2.39					
Managed Turf (acres) disturbed,										
graded for yards or other turf to be										
mowed/managed	0.00	0.00	0.00	52.78	52.78					
Impervious Cover (acres)	0.00	0.00	0.00	26.72	26.72					
				Total	81.89					
Apply Practices that Rem	ove Pollut	ants but Do	Not Reduce R	unoff Volun	ne					
Apply Practices that Rem	ove Pollut	ants but Do	Area (excluding areas treated by upstream	Phosphorus	Runoff from Upstream RR		Untreated Phosphorus		Remaining Phosphorus	Treatment to
Practice		ants but Do	Area (excluding areas treated by		Runoff from Upstream RR	•	Untreated Phosphorus Load to Practice (lbs.)		Phosphorus	Downstream Treatment to be Employed
			Area (excluding areas treated by upstream	Phosphorus	Runoff from Upstream RR	from Upstream RR		Removed By	Phosphorus	Treatment to
Practice	impervious a	Unit acres draining to	Area (excluding areas treated by upstream practices)	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs)	Load to Practice (lbs.)	Removed By Practice (lbs.)	Phosphorus Load (lbs.)	Treatment to be Employed
Practice 12. Constructed Wetland	impervious a	Unit acres draining to etland	Area (excluding areas treated by upstream practices)	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs)	Load to Practice (lbs.) 58.62	Removed By Practice (lbs.)	Phosphorus Load (lbs.)	Treatment to be Employe
Practice 12. Constructed Wetland	impervious a	Unit acres draining to etland aining to wetland	Area (excluding areas treated by upstream practices)	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs)	Load to Practice (lbs.)	Removed By Practice (lbs.)	Phosphorus Load (lbs.)	Treatment to be Employe
Practice 12. Constructed Wetland	impervious a we turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to	Area (excluding areas treated by upstream practices) 26.72 52.78	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs) 0.00 0.00	58.62 30.47	Removed By Practice (lbs.) 29.31 15.24	Phosphorus Load (lbs.) 29.31 15.24	Treatment to be Employe
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a we turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland acres draining to etland	Area (excluding areas treated by upstream practices) 26.72 52.78	Phosphorus Efficiency (%) 50 50 75	Runoff from Upstream RR Practices (cf) 0.00 0.00	from Upstream RR Practices (lbs) 0.00 0.00 0.00	58.62 30.47	Removed By Practice (lbs.) 29.31 15.24	Phosphorus Load (lbs.) 29.31 15.24	Treatment to be Employed
Practice 2. Constructed Wetland .a.Constructed Wetland #1 (Spec #13	impervious a we turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to	Area (excluding areas treated by upstream practices) 26.72 52.78	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs) 0.00 0.00 0.00	58.62 30.47	Removed By Practice (lbs.) 29.31 15.24	Phosphorus Load (lbs.) 29.31 15.24	Treatment to be Employe
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a we turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland acres draining to etland	Area (excluding areas treated by upstream practices) 26.72 52.78 0.00 0.00	Phosphorus Efficiency (%) 50 50 75 75	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00	58.62 30.47 0.00	29.31 15.24 0.00	Phosphorus Load (lbs.) 29.31 15.24	Treatment to be Employe
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a we turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland acres draining to etland	Area (excluding areas treated by upstream practices) 26.72 52.78 0.00 0.00	Phosphorus Efficiency (%) 50 50 75 75	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 0.00	58.62 30.47 0.00 0.00	29.31 15.24 0.00 44.55	Phosphorus Load (lbs.) 29.31 15.24	Treatment to be Employe
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a we turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland acres draining to etland	Area (excluding areas treated by upstream practices) 26.72 52.78 0.00 0.00	Phosphorus Efficiency (%) 50 50 75 75	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 0.00	58.62 30.47 0.00	29.31 15.24 0.00 44.55	Phosphorus Load (lbs.) 29.31 15.24	Treatment to be Employe
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a we turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland aining to wetland aining to wetland	Area (excluding areas treated by upstream practices) 26.72 52.78 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY P	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU TAL PHOSPHORUS R	58.62 30.47 0.00 0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (Ib/yr)	29.31 15.24 0.00 0.00 44.55 44.55	Phosphorus Load (lbs.) 29.31 15.24	Treatment to be Employe
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a we turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland aining to wetland aining to wetland	Area (excluding areas treated by upstream practices) 26.72 52.78 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY P	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU TAL PHOSPHORUS R	58.62 30.47 0.00 0.00	29.31 15.24 0.00 0.00 44.55 44.55	Phosphorus Load (lbs.) 29.31 15.24	Treatment to be Employe
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a we turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland aining to wetland aining to wetland	Area (excluding areas treated by upstream practices) 26.72 52.78 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY P	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU TAL PHOSPHORUS R	58.62 30.47 0.00 0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (Ib/yr)	29.31 15.24 0.00 0.00 44.55 44.55	Phosphorus Load (lbs.) 29.31 15.24	Treatment to be Employe
Practice	impervious a we turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland aining to wetland aining to wetland	Area (excluding areas treated by upstream practices) 26.72 52.78 0.00 0.00 PHOSPHORUS SEE WATER QUA	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY P	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT TO	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU FAL PHOSPHORUS R R SITE COMPLIAN	58.62 30.47 0.00 0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (Ib/yr)	29.31 15.24 0.00 0.00 44.55 44.55	Phosphorus Load (lbs.) 29.31 15.24	Treatment to be Employe

Site Results		
Phosphorous		
TOTAL TREATMENT VOLUME (cf)	140,476	
TOTAL PHOSPHOROUS LOAD REDUCTION REQUIRED (LB/YEAR)	55.90	
RUNOFF REDUCTION (cf)	0	
PHOSPHOROUS LOAD REDUCTION ACHIEVED (LB/YR)	44.55	
ADJUSTED POST-DEVELOPMENT PHOSPHOROUS LOAD (TP) (lb/yr)	44.92	
REMAINING PHOSPHOROUS LOAD REDUCTION (LB/YR) NEEDED	11.35	
NII. (1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		
Nitrogen (for information purposes)		
TOTAL TREATMENT VOLUME (cf)	140,476	
RUNOFF REDUCTION (cf)	0	
NITROGEN LOAD REDUCTION ACHIEVED (LB/YR)	127.47	
ADJUSTED POST-DEVELOPMENT NITROGEN LOAD (TP) (lb/yr)	512.59	

Virginia Runoff Reduction Methor	oa worksneet	Revised 03	/25/2011		
Site Data					
Project Name: Buckroe Shopping Ma	II Pormoshlo Ps	woment			
	iii rei iiieabie ra	IVEIIICIIL			
Date: November, 2013		1			
	1.4.1.4.11				
	data input cells				
	calculation cells				
	constant values				
4. Beet Beetlemment Businet 0.1	1 0 1	.			
1. Post-Development Project & I	and Cover in	Tormation			
Constants					
Annual Rainfall (inches)	44				
Target Rainfall Event (inches)	1.00				
Phosphorus EMC (mg/L)	0.26		Nitrogen EMC (mg/L)	1.86	
Target Phosphorus Target Load (lb/acre/yr)	0.41		ranogon Livio (mg/L)	1.00	
Pj	0.90				
]	0.30				
Land Cover (acres)					
	A soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) undisturbed,					
protected forest/open space or reforested land	0.00	0.00	0.00	0.10	0.10
Managed Turf (acres) disturbed, graded for	0.00	0.00	0.00	0110	51.15
yards or other turf to be mowed/managed	0.00	0.00	0.00	0.26	0.26
Impervious Cover (acres)	0.00	0.00	0.00	7.80	7.80
impervious sever (usies)	0.00	0.00	0.00	Total	8.16
				. • • • • • • • • • • • • • • • • • • •	0.10
Rv Coefficients					
	A soils	B Soils	C Soils	D Soils	
Forest/Open Space	0.02	0.03	0.04	0.05	
Managed Turf	0.15	0.20	0.22	0.25	
Impervious Cover	0.95	0.95	0.95	0.95	
Impervious Cover	0.93	0.33	0.93	0.95	
Land Cover Summary	+				
Forest/Open Space Cover (acres)	0.10)			
Weighted Rv(forest)	0.05				
% Forest	1%				
Managed Turf Cover (acres)	0.26				
Weighted Rv(turf)	0.25				
% Managed Turf	3%				
mpervious Cover (acres)	7.80				
Rv(impervious)	0.95				
\ 1 /					
% Impervious	96%				
Total Site Area (acres)	8.16				
Site Rv	0.92	4			
Cont Development Transfer of Malayse (a. 1921)					
Post-Development Treatment Volume (acre-ft)	0.62	4			
Post-Development Treatment Volume (cubic		I			
eet)	27,152				
Post_Development Load (TP) (lb/yr)	17.29	Post_Dev	elopment Load (TN) (lb/yr)	123.72	
Total Load (TP) Reduction Required (lb/yr)	13.95				

D ·	<u> </u>				1	T .		I		1			ı	T .
Drainage Area - Buckroe	Snopping I	Maii Perme	able Pavement											
Drainage Area A Land Cover (acres														
F()	A soils	B Soils	C Soils	D Soils	Totals									
Forest/Open Space (acres) undisturbed, protected forest/open														
space or reforested land	0.00	0.00	0.00	0.10	0.10									
Managed Turf (acres) disturbed,	0.00	0.00	0.00	0.10	0.10					-				
graded for yards or other turf to be														
mowed/managed	0.00	0.00	0.00	0.26	0.26									
Impervious Cover (acres)	0.00	0.00	0.00	7.80	7.80									
				Total	8.16									
Apply Runoff Reduction F	Practices to	Reduce T	reatment Volur	ne & Post-I	Development	Load in Drainac	le Area A							
												Untreated	L	
							Volume from Upstream	D #	Remaining Runoff Volume	Db b	Phosphorus Load from Upstream			Remaining Phosphorus
Credit	l .	Unit	Description	of Crodit	Credit	Credit Area (acres)		Runon Reduction (cf)			RR Practices (lbs)		Removed By Practice (lbs.)	
Credit	<u> </u>	Unit	Description	or Credit	Credit	Credit Area (acres)	RR Practice (ci)	Reduction (CI)	(01)	Efficiency (%)	RR Practices (IDS)	(IDS.)	Practice (ibs.)	Load (ibs.)
3. Permeable Pavement														
	acres of perme	eable pavement	+											
3.a. Permeable Pavement #1 (Spec #							_		_					
	imperviou	us pavement	45% runoff volu	me reduction	0.45	0.00	0	0	0	25	0.00	0.00	0.00	0.00
3.b. Permeable Pavement #2 (Spec #	acres of perm	neable pavement	75% runoff volu	me reduction	0.75	7.80	0	20174	6725	25	0.00	17.11	13.90	3.2
	acres or peril	loable pavellielli	7570 TUTION VOIC	inc reduction	5.75	7.00	0	20174	5725	20	0.00	17.11	13.30	3.2
							Land of the control o	10.05		ļ				
					TOTAL PHOSP		REQUIRED ON SITE (Ib/yr)	13.95						
			DU	OCDUODUC DE	MOVAL FROM BU		REDUCTION IN D.A. A (cf) RACTICES IN D.A. A (lb/yr)	20,174 13.90						
L			PH	USPHURUS RE	WOVAL FROM RU	NOFF KEDUCTION PR	RACTICES IN D.A. A (ID/YF)	13.90						

Site Results		
Phosphorous		
TOTAL TREATMENT VOLUME (cf)	27,152	
TOTAL PHOSPHOROUS LOAD REDUCTION REQUIRED (LB/YEAR)	13.95	
RUNOFF REDUCTION (cf)		
PHOSPHOROUS LOAD REDUCTION ACHIEVED (LB/YR)	13.90	
ADJUSTED POST-DEVELOPMENT PHOSPHOROUS LOAD (TP) (lb/yr)	3.39	
DELIANUNG BUGGBUGBGUG LOAD BERUGTION (LDN/D) NEEDED	0.04	
REMAINING PHOSPHOROUS LOAD REDUCTION (LB/YR) NEEDED	0.04	
Nitrogen (for information purposes)		
TOTAL TREATMENT VOLUME (cf)	27,152	
RUNOFF REDUCTION (cf)	20174	
NITROGEN LOAD REDUCTION ACHIEVED (LB/YR)		
ADJUSTED POST-DEVELOPMENT NITROGEN LOAD (TP) (lb/yr)	24.25	

Site Data					
Project Name: Buckroe Avenue Rede	velonment Con	structed Wetlan	nd Retrofit		
	velopilient cons	Structed Wetla	ilu Netroni		
Date: November, 2013	1				
	data input calla				
	data input cells calculation cells				
	constant values				
	Constant values				
1. Post-Development Project & L	and Cover In	formation			
1. Post-Development Project & L	and Cover in	iormation			
Constants					
Constants					
Annual Rainfall (inches)	44				
Target Rainfall Event (inches)	1.00				
Phosphorus EMC (mg/L)	0.26		Nitrogen EMC (mg/L)	1.86	
Target Phosphorus Target Load (lb/acre/yr)	0.41		THEOGOTI LIVIO (ITIG/L)	1.00	
Pi	0.90				
,					
Land Cover (acres)					
` '	A soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) undisturbed,					
protected forest/open space or reforested land	0.00	0.00	0.00	0.49	0.49
Managed Turf (acres) disturbed, graded for					
yards or other turf to be mowed/managed	0.00	0.00	0.00	16.54	16.54
Impervious Cover (acres)	0.00	0.00	0.00	7.03	7.03
				Total	24.06
Rv Coefficients					
- 40	A soils	B Soils	C Soils	D Soils	
Forest/Open Space	0.02	0.03	0.04	0.05	
Managed Turf	0.15	0.20	0.22	0.25	
Impervious Cover	0.95	0.95	0.95	0.95	
		1			
Land Cover Summary		 			
Forest/Open Space Cover (acres)	0.49				
Weighted Rv(forest)	0.45				
% Forest	2%				
Managed Turf Cover (acres)	16.54				
Weighted Rv(turf)	0.25				
% Managed Turf	69%				
Impervious Cover (acres)	7.03				
Rv(impervious)	0.95				
% Impervious	29%				
Total Site Area (acres)	24.06				
Site Rv	0.45				
Post-Development Treatment Volume (acre-ft)	0.90				
Post-Development Treatment Volume (cubic					
feet)	39,342				
· · · · · · · · · · · · · · · · · · ·					**
Post_Development Load (TP) (lb/yr) Total Load (TP) Reduction Required (lb/yr)	25.06 15.19		evelopment Load (TN) (lb/yr)	179.2	6

Drainage Area - Buckroe	TTOITE INC	- Copine								
Orainage Area A Land Cover (acres										
	A soils	B Soils	C Soils	D Soils	Totals					
Forest/Open Space (acres)										
undisturbed, protected forest/open										
space or reforested land	0.00	0.00	0.00	0.49	0.49					
Managed Turf (acres) disturbed,										
graded for yards or other turf to be	0.00	0.00	0.00	40.54	40.54					
mowed/managed	0.00	0.00	0.00	16.54 7.03	16.54 7.03					
Impervious Cover (acres)	0.00	0.00	0.00	Total	24.06					
				rotai	24.06					
Apply Practices that Rem	ove Pollut	ants but Do	Not Reduce R	unoff Volun	ne					
Apply Practices that Rem	ove Pollut	ants but Do	Not Reduce R Area (excluding areas treated by upstream		Ne Runoff from Upstream RR	Phosphorus Load from Upstream RR	Untreated Phosphorus	Phosphorus Removed By	Remaining Phosphorus	
		ants but Do	Area (excluding areas treated by		Runoff from Upstream RR	•	Untreated Phosphorus Load to Practice (lbs.)		Phosphorus	Downstream Treatment to be Employed
Apply Practices that Rem Practice 12. Constructed Wetland			Area (excluding areas treated by upstream	Phosphorus	Runoff from Upstream RR	from Upstream RR		Removed By	Phosphorus	Treatment to
Practice			Area (excluding areas treated by upstream	Phosphorus	Runoff from Upstream RR	from Upstream RR		Removed By	Phosphorus	Treatment to
Practice	impervious a	Unit	Area (excluding areas treated by upstream	Phosphorus	Runoff from Upstream RR	from Upstream RR Practices (lbs)		Removed By	Phosphorus Load (lbs.)	Treatment to be Employe
Practice 12. Constructed Wetland	impervious a	Unit acres draining to etland aining to wetland	Area (excluding areas treated by upstream practices)	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs)	Load to Practice (lbs.)	Removed By Practice (lbs.)	Phosphorus Load (lbs.)	Treatment to be Employe
Practice 12. Constructed Wetland	impervious a w turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to	Area (excluding areas treated by upstream practices) 7.03 16.54	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs) 0.00 0.00	Load to Practice (lbs.) 15.42 9.55	Removed By Practice (lbs.) 7.71 4.77	Phosphorus Load (lbs.) 7.71 4.77	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a wi turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland acres draining to etland	Area (excluding areas treated by upstream practices) 7.03 16.54	Phosphorus Efficiency (%) 50 50 75	Runoff from Upstream RR Practices (cf) 0.00 0.00	from Upstream RR Practices (lbs) 0.00 0.00 0.00	15.42 9.55	Removed By Practice (lbs.) 7.71 4.77	Phosphorus Load (lbs.) 7.71 4.77 0.00	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a wi turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to	Area (excluding areas treated by upstream practices) 7.03 16.54	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs) 0.00 0.00 0.00	Load to Practice (lbs.) 15.42 9.55	Removed By Practice (lbs.) 7.71 4.77	Phosphorus Load (lbs.) 7.71 4.77 0.00	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a wi turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland acres draining to etland	Area (excluding areas treated by upstream practices) 7.03 16.54 0.00 0.00	Phosphorus Efficiency (%) 50 50 75 75	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00	15.42 9.55 0.00	7.71 4.77 0.00	Phosphorus Load (lbs.) 7.71 4.77 0.00	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a wi turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland acres draining to etland	Area (excluding areas treated by upstream practices) 7.03 16.54 0.00 0.00	Phosphorus Efficiency (%) 50 50 75 75	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 0.00	15.42 9.55 0.00 0.00	7.71 4.77 0.00 0.00	Phosphorus Load (lbs.) 7.71 4.77 0.00	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a wi turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland acres draining to etland	Area (excluding areas treated by upstream practices) 7.03 16.54 0.00 0.00	Phosphorus Efficiency (%) 50 50 75 75	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 0.00	15.42 9.55 0.00	7.71 4.77 0.00	Phosphorus Load (lbs.) 7.71 4.77 0.00	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a wi turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland aining to wetland aining to wetland	Area (excluding areas treated by upstream practices) 7.03 16.54 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY P	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU TAL PHOSPHORUS R	15.42 9.55 0.00 0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (Ib/yr)	7.71 4.77 0.00 0.00	Phosphorus Load (lbs.) 7.71 4.77 0.00	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a wi turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland aining to wetland aining to wetland	Area (excluding areas treated by upstream practices) 7.03 16.54 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY P	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU TAL PHOSPHORUS R	15.42 9.55 0.00 0.00	7.71 4.77 0.00 0.00	Phosphorus Load (lbs.) 7.71 4.77 0.00	Treatment to be Employed
Practice	impervious a wi turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland aining to wetland aining to wetland	Area (excluding areas treated by upstream practices) 7.03 16.54 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY P	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU TAL PHOSPHORUS R	15.42 9.55 0.00 0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (Ib/yr)	7.71 4.77 0.00 0.00	Phosphorus Load (lbs.) 7.71 4.77 0.00	Treatment to be Employed
Practice 12. Constructed Wetland 2.a.Constructed Wetland #1 (Spec #13	impervious a wi turf acres dra impervious a	Unit acres draining to etland aining to wetland acres draining to etland aining to wetland aining to wetland	Area (excluding areas treated by upstream practices) 7.03 16.54 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY P	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT TO	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU FAL PHOSPHORUS R R SITE COMPLIAN	15.42 9.55 0.00 0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (Ib/yr)	7.71 4.77 0.00 0.00	Phosphorus Load (lbs.) 7.71 4.77 0.00	Treatment to be Employe

39,342	
15.19	
0	
12.49	
12.57	
2.71	
39,342	
0	
-	
30.10	
143.53	
1 10100	
	15.19 0 12.49 12.57 2.71

Site Data					
Project Name: Amherst Road Constru	icted Wetland P	etrofit		 	†
	acted Wetland N	elioni			
Date: November, 2013		ı			
	data input cells				
	calculation cells				
	constant values				+
	CONSTAINT VAIGES				
1. Post-Development Project & L	and Cover Int	formation			
1. Post-Development Project & L	and Cover in	ormation			
Constants					
Constants					
Annual Rainfall (inches)	44				
Target Rainfall Event (inches)	1.00				+
Phosphorus EMC (mg/L)	0.26		Nitrogen EMC (mg/L)	1.86	1
Target Phosphorus Target Load (lb/acre/yr)	0.41		Nitiogen Livio (mg/L)	1.00	
Pi	0.90			1	†
• 1	0.00				+
Land Cover (acres)					1
(2000)	A soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) undisturbed,					
protected forest/open space or reforested land	0.00	0.00	0.00	2.83	2.83
Managed Turf (acres) disturbed, graded for					
yards or other turf to be mowed/managed	0.00	0.00	0.00	35.08	35.08
Impervious Cover (acres)	0.00	0.00	0.00	25.63	25.63
				Total	63.54
Rv Coefficients					
	A soils	B Soils	C Soils	D Soils	
Forest/Open Space	0.02	0.03	0.04	0.05	
Managed Turf	0.15	0.20	0.22	0.25	
Impervious Cover	0.95	0.95	0.95	0.95	
Land Cover Summary					+
Forest/Open Space Cover (acres)	2.02				+
Weighted Rv(forest)	2.83 0.05				+
% Forest	4%				+
Managed Turf Cover (acres)	35.08				+
Weighted Rv(turf)	0.25				+
% Managed Turf	55%				1
Impervious Cover (acres)	25.63				+
Rv(impervious)	0.95			1	†
% Impervious	40%				+
Total Site Area (acres)	63.54				+
Site Rv	0.52			1	1
	3.02			1	1
Post-Development Treatment Volume (acre-ft)	2.77				1
Post-Development Treatment Volume (cubic					
1 Ost-Development Treatment Volume (Cubic		I			
feet)	120.734				
·	120,734 76.90		evelopment Load (TN) (lb/yr)	550.11	1

Site Data					
Dayler (Name - Fields Dains Occupations)	- 1 M-41 1 D-4	C'4		1	
Project Name: Fields Drive Construct	ed Wetland Ret	rotit			
Date: November, 2013					
	data input cells				
	calculation cells				
	constant values				
1. Post-Development Project & L	and Cover In	formation			
•					
Constants					
Annual Rainfall (inches)	44				
Target Rainfall Event (inches)	1.00				
Phosphorus EMC (mg/L)	0.26		Nitrogen EMC (mg/L)	1.86	
Target Phosphorus Target Load (lb/acre/yr)	0.41		, , , , , , , , , , , , , , , , , , ,		
Pj	0.90				
Land Cover (acres)					
	A soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) undisturbed,					
protected forest/open space or reforested land	0.00	0.00	0.00	1.97	1.97
Managed Turf (acres) disturbed, graded for					
yards or other turf to be mowed/managed	0.00	0.00	0.00	8.41	8.41
Impervious Cover (acres)	0.00	0.00	0.00	3.79	3.79
. ,				Total	14.17
Rv Coefficients					
	A soils	B Soils	C Soils	D Soils	
Forest/Open Space	0.02	0.03	0.04	0.05	
Managed Turf	0.15	0.20	0.22	0.25	
Impervious Cover	0.95	0.95	0.95	0.95	
·					
Land Cover Summary					
Forest/Open Space Cover (acres)	1.97				
Weighted Rv(forest)	0.05				
% Forest	14%				
Managed Turf Cover (acres)	8.41				
Weighted Rv(turf)	0.25				
% Managed Turf	59%				
Impervious Cover (acres)	3.79				
Rv(impervious)	0.95				
% Impervious	27%	b			
Total Site Area (acres)	14.17				
Site Rv	0.41				
Post-Development Treatment Volume (acre-ft)	0.48	3			
Post-Development Treatment Volume (cubic					
feet)	21,059	Ð			
Post_Development Load (TP) (lb/yr)	13.41	Post_Dev	elopment Load (TN) (lb/yr)	95.9	96
Total Load (TP) Reduction Required (lb/yr)	7.60		1		

									1	
Drainage Area - Fields Dri	ve									
	 									
Drainage Area A Land Cover (acres	<u> </u>									
Diamage Area A Land Cover (acres	A soils	B Soils	C Soils	D Soils	Totals					
Forest/Open Space (acres)	A SUIIS	D 30lls	C 30lis	D 30lls	Totals					
undisturbed, protected forest/open										
space or reforested land	0.00	0.00	0.00	1.97	1.97					
Managed Turf (acres) disturbed,	0.00	0.00	0.00	1.37	1.31					
graded for yards or other turf to be										
mowed/managed	0.00	0.00	0.00	8.41	8.41					
Impervious Cover (acres)	0.00	0.00	0.00	3.79	3.79					
	0.00	0.00	0.00		14.17					
,				Intal						
	Dellute	mto but Do	Not Doduce D	Total						
Apply Practices that Remo	ove Polluta	ants but Do								
	ove Polluta	ents but Do	Area (excluding		me					
	ove Polluta	ents but Do	Area (excluding areas treated by	unoff Volur	ne Runoff from	Phosphorus Load		Phosphorus	Remaining	Downstream
Apply Practices that Rem			Area (excluding areas treated by upstream	unoff Volur	ne Runoff from Upstream RR	from Upstream RR	Untreated Phosphorus	Removed By	Phosphorus	Treatment to
Apply Practices that Remo		ants but Do	Area (excluding areas treated by	unoff Volur	ne Runoff from Upstream RR	from Upstream RR	Untreated Phosphorus Load to Practice (lbs.)	Removed By		Treatment to
Apply Practices that Remo			Area (excluding areas treated by upstream	unoff Volur	ne Runoff from Upstream RR	from Upstream RR		Removed By	Phosphorus	Treatment to
Apply Practices that Remo	U		Area (excluding areas treated by upstream	unoff Volur	ne Runoff from Upstream RR	from Upstream RR		Removed By	Phosphorus	Treatment to
Apply Practices that Remo	U impervious ac	lnit	Area (excluding areas treated by upstream	unoff Volur Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs)		Removed By Practice (lbs.)	Phosphorus Load (lbs.)	Treatment to be Employed
Apply Practices that Remo	impervious ac wet turf acres drai	Init cres draining to tland ining to wetland	Area (excluding areas treated by upstream practices)	unoff Volur Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs)	Load to Practice (lbs.)	Removed By Practice (lbs.)	Phosphorus Load (lbs.)	Treatment to be Employed
	impervious ac wet turf acres drai	Init cres draining to	Area (excluding areas treated by upstream practices)	unoff Volur Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs)	Load to Practice (lbs.) 8.31	Removed By Practice (lbs.)	Phosphorus Load (lbs.)	Treatment to be Employed
Apply Practices that Remo	impervious ac wet turf acres drai impervious ac wet	Init cres draining to tland ining to wetland cres draining to tland	Area (excluding areas treated by upstream practices) 3.79 8.41	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs) 0.00 0.00 0.00	Load to Practice (lbs.) 8.31	Removed By Practice (lbs.)	Phosphorus Load (lbs.) 4.16 2.43	Treatment to be Employed
Apply Practices that Remo	impervious ac wet turf acres draii impervious ac wet	Init cres draining to tland ining to wetland cres draining to tland	Area (excluding areas treated by upstream practices) 3.79 8.41	Phosphorus Efficiency (%)	Runoff from Upstream RR Practices (cf)	from Upstream RR Practices (lbs) 0.00 0.00 0.00	8.31 4.86	Removed By Practice (lbs.) 4.16 2.43	Phosphorus Load (lbs.) 4.16 2.43	Treatment to be Employed
Apply Practices that Remo	impervious ac wet turf acres drai impervious ac wet	Init cres draining to tland ining to wetland cres draining to tland	Area (excluding areas treated by upstream practices) 3.79 8.41 0.00 0.00	Phosphorus Efficiency (%) 50 50 75 75	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00	0.00 0.00 0.00 0.00	8.31 4.86 0.00	Removed By Practice (lbs.) 4.16 2.43 0.00 0.00	Phosphorus Load (lbs.) 4.16 2.43	Treatment to be Employed
Apply Practices that Remo	impervious ac wet turf acres drai impervious ac wet	Init cres draining to tland ining to wetland cres draining to tland	Area (excluding areas treated by upstream practices) 3.79 8.41 0.00 0.00	Phosphorus Efficiency (%) 50 50 75 75	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 0.00	8.31 4.86 0.00 0.00	Removed By Practice (lbs.) 4.16 2.43 0.00 0.00	Phosphorus Load (lbs.) 4.16 2.43	Treatment to be Employed
Apply Practices that Remo	impervious ac wet turf acres drai impervious ac wet	Init cres draining to tland ining to wetland cres draining to tland	Area (excluding areas treated by upstream practices) 3.79 8.41 0.00 0.00	Phosphorus Efficiency (%) 50 50 75 75	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 0.00	8.31 4.86 0.00	Removed By Practice (lbs.) 4.16 2.43 0.00 0.00	Phosphorus Load (lbs.) 4.16 2.43	Treatment to be Employed
Apply Practices that Remo	impervious ac wet turf acres drai impervious ac wet	cres draining to tland ining to wetland cres draining to tland ining to wetland ining to wetland ining to wetland	Area (excluding areas treated by upstream practices) 3.79 8.41 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY P	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU TAL PHOSPHORUS RI	8.31 4.86 0.00 0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (Ib/yr)	Removed By Practice (lbs.) 4.16 2.43 0.00 0.00	Phosphorus Load (lbs.) 4.16 2.43	Treatment to be Employed
Apply Practices that Remo	impervious ac wet turf acres drai impervious ac wet	cres draining to tland ining to wetland cres draining to tland ining to wetland ining to wetland ining to wetland	Area (excluding areas treated by upstream practices) 3.79 8.41 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY P	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU TAL PHOSPHORUS RI	8.31 4.86 0.00 0.00	Removed By Practice (lbs.) 4.16 2.43 0.00 0.00	Phosphorus Load (lbs.) 4.16 2.43	Treatment to be Employed
Apply Practices that Remo	impervious ac wet turf acres drai impervious ac wet	cres draining to tland ining to wetland cres draining to tland ining to wetland ining to wetland ining to wetland	Area (excluding areas treated by upstream practices) 3.79 8.41 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY P	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU TAL PHOSPHORUS RI	8.31 4.86 0.00 0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (Ib/yr)	Removed By Practice (lbs.) 4.16 2.43 0.00 0.00	Phosphorus Load (lbs.) 4.16 2.43	Treatment to be Employed
Apply Practices that Remo	impervious ac wet turf acres drai impervious ac wet	cres draining to tland ining to wetland cres draining to tland ining to wetland ining to wetland ining to wetland	Area (excluding areas treated by upstream practices) 3.79 8.41 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY P	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU TAL PHOSPHORUS RI	8.31 4.86 0.00 0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (Ib/yr)	Removed By Practice (lbs.) 4.16 2.43 0.00 0.00	Phosphorus Load (lbs.) 4.16 2.43	Treatment to be Employed
Apply Practices that Remo	impervious ac wet turf acres drai impervious ac wet	cres draining to tland ining to wetland cres draining to tland ining to wetland ining to wetland ining to wetland	Area (excluding areas treated by upstream practices) 3.79 8.41 0.00 0.00 PHOSPHORUS	Phosphorus Efficiency (%) 50 50 75 75 REMOVAL BY P	Runoff from Upstream RR Practices (cf) 0.00 0.00 0.00 RACTICES THAT TO	from Upstream RR Practices (lbs) 0.00 0.00 0.00 0.00 DO NOT REDUCE RU FAL PHOSPHORUS RI R SITE COMPLIAN	8.31 4.86 0.00 0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (Ib/yr)	Removed By Practice (lbs.) 4.16 2.43 0.00 0.00	Phosphorus Load (lbs.) 4.16 2.43	Treatment to be Employed

Site Results			
Phosphorous			
TOTAL TREATMENT VOLUME (cf)	21,059		
TOTAL PHOSPHOROUS LOAD REDUCTION REQUIRED (LB/YEAR)	7.60		
RUNOFF REDUCTION (cf)	0		
PHOSPHOROUS LOAD REDUCTION ACHIEVED (LB/YR)	6.59		
ADJUSTED POST-DEVELOPMENT PHOSPHOROUS LOAD (TP) (lb/yr)	6.83		
REMAINING PHOSPHOROUS LOAD REDUCTION (LB/YR) NEEDED	1.02		
Nitrogen (for information purposes)			
TOTAL TREATMENT VOLUME (cf)	21,059		
RUNOFF REDUCTION (cf)	0		
NITROGEN LOAD REDUCTION ACHIEVED (LB/YR)	18.84		
	.0101		
ADJUSTED POST-DEVELOPMENT NITROGEN LOAD (TP) (lb/yr)	77.11		

Site Data					
Day's at Name - Hall Day I Oamstown to	I Martine at Dates	C '4			
Project Name: Hall Road Constructed	i wetiand Retro	TIT			
Date: November, 2013					
	data input cells				
	calculation cells				
	constant values				
1. Post-Development Project & L	and Cover In	formation			
Constants					
Annual Rainfall (inches)	44				
Target Rainfall Event (inches)	1.00				
Phosphorus EMC (mg/L)	0.26		Nitrogen EMC (mg/L)	1.86	
Target Phosphorus Target Load (lb/acre/yr)	0.41		J - (·9·-/		
Pj	0.90				
,					
Land Cover (acres)					
, ,	A soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) undisturbed,					
protected forest/open space or reforested land	0.00	0.00	0.00	6.19	6.19
Managed Turf (acres) disturbed, graded for					
yards or other turf to be mowed/managed	0.00	0.00	0.00	6.23	6.23
Impervious Cover (acres)	0.00	0.00	0.00	5.87	5.87
				Total	18.29
Rv Coefficients					
	A soils	B Soils	C Soils	D Soils	
Forest/Open Space	0.02	0.03	0.04	0.05	
Managed Turf	0.15	0.20	0.22	0.25	
Impervious Cover	0.95	0.95	0.95	0.95	
ļ					
Land Cover Summary					
Forest/Open Space Cover (acres)	6.19				
Weighted Rv(forest)	0.05				
% Forest	34%				
Managed Turf Cover (acres)	6.23				
Weighted Rv(turf)	0.25				
% Managed Turf	34%				
Impervious Cover (acres)	5.87				
Rv(impervious)	0.95				
% Impervious	32%				
Total Site Area (acres)	18.29				
Site Rv	0.41				
Post-Development Treatment Volume (acre-ft)	0.62	2			
Post-Development Treatment Volume (cubic		1			
feet)	27,020				
Post_Development Load (TP) (lb/yr)	17.21	Post_Dev	velopment Load (TN) (lb/yr)	123.1	11
Total Load (TP) Reduction Required (lb/yr)	9.71				

		1	T	I		1		T		1
Drainage Area - Hall Road										
Drainage Area A Land Cover (acres	\ \									
Dramage Area A Land Cover (acres	A soils	B Soils	C Soils	D Soils	Totals					
Forest/Open Space (acres)	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		0 000	2 000						
undisturbed, protected forest/open										
space or reforested land	0.00	0.00	0.00	6.19	6.19					
Managed Turf (acres) disturbed,										
graded for yards or other turf to be										
mowed/managed	0.00	0.00	0.00	6.23	6.23					
Impervious Cover (acres)	0.00	0.00	0.00	5.87	5.87					
				Total	18.29					
Apply Practices that Rem	ove Polluta	ints but Do		unott Volur	ne 					
			Area (excluding							
			areas treated by		Runoff from	Phosphorus Load		Phosphorus	Remaining	Downstream
			upstream	Phosphorus	Upstream RR		Untreated Phosphorus		Phosphorus	Treatment to
Practice	U	nit	practices)	Efficiency (%)	Practices (cf)	Practices (lbs)	Load to Practice (lbs.)	Practice (lbs.)	Load (lbs.)	be Employed
12. Constructed Wetland										
		cres draining to								
		tland	5.87	50	0.00		12.88	6.44		
2.a.Constructed Wetland #1 (Spec #13		ning to wetland	6.23	50	0.00	0.00	3.60	1.80	1.80	
	impervious acres draining to									
	we	tland	0.00	75	0.00	0.00	0.00	0.00	0.00	
2.b. Constructed Wetland #2 (Spec #1)							0.00			
	turf acres drai	ning to wetland	0.00	75	0.00		0.00	0.00		
	turf acres drai		0.00	75	0.00	0.00	0.00	0.00		
(open n	turf acres drai		0.00	75	0.00 PRACTICES THAT	0.00 DO NOT REDUCE RUI	0.00 NOFF VOLUME IN D.A. A	0.00 8.24		
	turf acres drai		0.00	75	0.00 PRACTICES THAT	0.00 DO NOT REDUCE RUI	0.00	0.00		
	turf acres drai	ning to wetland	0.00 PHOSPHORUS	75 REMOVAL BY P	0.00 PRACTICES THAT	0.00 DO NOT REDUCE RUI FAL PHOSPHORUS RI	0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (lb/yr)	0.00 8.24		
	turf acres drai	ning to wetland	0.00 PHOSPHORUS	75 REMOVAL BY P	0.00 PRACTICES THAT	0.00 DO NOT REDUCE RUI FAL PHOSPHORUS RI	0.00 NOFF VOLUME IN D.A. A	0.00 8.24		
	turf acres drai	ning to wetland	0.00 PHOSPHORUS	75 REMOVAL BY P	0.00 PRACTICES THAT	0.00 DO NOT REDUCE RUI FAL PHOSPHORUS RI	0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (lb/yr)	0.00 8.24		
	turf acres drai	ning to wetland	0.00 PHOSPHORUS SEE WATER QUA	75 REMOVAL BY P	RACTICES THAT TO	DO NOT REDUCE RUITAL PHOSPHORUS RI	0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (Ib/yr) ICE CALCULATIONS	8.24 8.24		
	turf acres drai	ning to wetland	0.00 PHOSPHORUS SEE WATER QUA	75 REMOVAL BY P	RACTICES THAT TO IANCE TAB FO PRACTICES THAT	DO NOT REDUCE RUITAL PHOSPHORUS RIESTE COMPLIAN	0.00 NOFF VOLUME IN D.A. A EMOVAL IN D.A. A (lb/yr)	0.00 8.24		

Site Results		
Phosphorous		
TOTAL TREATMENT VOLUME (cf)	27,020	
TOTAL PHOSPHOROUS LOAD REDUCTION REQUIRED (LB/YEAR)	9.71	
RUNOFF REDUCTION (cf)		
PHOSPHOROUS LOAD REDUCTION ACHIEVED (LB/YR)	8.24	
ADJUSTED POST-DEVELOPMENT PHOSPHOROUS LOAD (TP) (lb/yr)	8.97	
REMAINING PHOSPHOROUS LOAD REDUCTION (LB/YR) NEEDED	1.47	
Nitrogen (for information purposes)		
TOTAL TREATMENT VOLUME (cf)	27,020	
RUNOFF REDUCTION (cf)	0	
NITROGEN LOAD REDUCTION ACHIEVED (LB/YR)		
ADJUSTED POST-DEVELOPMENT NITROGEN LOAD (TP) (lb/yr)	99.54	